ARIZONA DEPARTMENT OF HEALTH SERVICES

BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

LEVEL I TRAUMA CENTERS

PERFORMANCE IMPROVEMENT MEASURES

ARIZONA STATE TRAUMA REGISTRY 2012

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Report No. 13-4-LI

Purpose:

The purpose of this report is to provide hospitals a baseline level of comparison on their performance in 2012. This report can be used to support Quality Assurance initiatives in their communities.

This report analyzes four trauma related performance measures:

1. Reduce Emergency Department (ED) dwell time at Level IV trauma centers before transfer to Level I trauma centers
2. Reduce transfers after admission
3. Reduce deaths outside of trauma centers
4. Increase trauma billing efficiency

Methodology:

The Arizona State Trauma Registry 2012 (ASTR) and the Hospital Discharge Database 2012 (HDD) were queried for data on the four measures.

1) Patients with an ED disposition of "Transfer to acute care" were filtered. The final transfer destination was an Arizona Level I Center or an acute care facility in Nevada.

The ED Dwell time is the difference between two elements "ED/Hospital Arrival Date/Time" and "ED Exit Date/Time", or if unable, "Length of Stay".[1] **This measure used transfer data from Level IV Trauma Centers for your facility.**

2) The transfer after admission was calculated by first filtering patients who were admitted and then had a final discharge disposition as transfer. The final hospital discharge destination was an Arizona Level I trauma centers or a Nevada acute care facility.[1] **This measure used transfer data from Level IV Trauma Centers for your facility.**

3) Patients that die in a Non-Trauma Centers was found by querying trauma related injuries in the HDD. Deaths were limited to hospitals that were not designated trauma centers in 2011.[2]

4) The trauma billing efficiency score was calculated by comparing patients who had a trauma team activation and arrived by ambulance in ASTR. A hospital that meets this criteria would qualify for 068X revenue under the HDD. A billing efficiency score was calculated by comparing the numbers reported in HDD and ASTR.[1,2]

[1] Source: Arizona State Trauma Registry

[2] Source: Hospital Discharge Database

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2012
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Performance Measure 1: Reduce ED Dwell Time

Table 1: ED dwell time by ISS by categorical classification

1st Performance Measure: ED dwell time (hrs)	Overall		By Injury Severity Score					
			*Missing/NA/ ND		ISS ≤15		ISS >15	
	N	%	N	%	N	%	N	%
<2 hours	172	21.0%	12	33.3%	132	20.3%	28	21.0%
≥2 hours	646	78.9%	24	66.6%	517	79.6%	105	78.9%
Total patients transferred	818	100%	36	100%	649	100%	133	100%

Table 2: Time distribution of ED dwell time

Median ED dwell time (hrs)	Count	25%	Median	75%	Max
Overall	782	2	3.1	4	28
By Injury Severity Score					
ISS ≤15	649	2	3.2	4	28
ISS >15	133	2	2.9	4	11

Traumatic injuries require that a system rapidly assess and intervene to prevent morbidity and mortality. One method for assessing performance on this measure is to evaluate the length of time patients are held in a level IV trauma center before they are transferred to a level I trauma center.

Most experts agree that patients whose injuries require a transport to a level I trauma center should be transferred within two hours of arrival at the level IV trauma center. **This measure exclusively analyzed 'transfer data' from Level IV Trauma Centers to a Level I Trauma Center.**

While there are various factors that contribute to a transfer, a sending facility can develop interventions and best practices that can reduce the ED dwell time.

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2012
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Performance Measure 2: Reduce transfers after admission

Table 3: Transfers after admission by length of stay

2nd Performance Measure: Transfer after admission	N	%
Total patients	18	100%
Los (Days)		
<1 day	6	33.3%
1	5	27.7%
2	2	11.1%
3	3	16.6%
10	1	5.5%
14	1	5.5%

The goal of any trauma system is to get the right patient to the right place in the right amount of time.

Depending upon the severity of injury, some patients should be evaluated and admitted at level a IV trauma centers. These facilities must have the resources and personnel necessary to address the needs of that patient.

This measure used 'patient transfer' data from Level IV Trauma Centers for a Level I facility.

Patients that are outside of a level IV trauma center's capabilities should be stabilized by the staff while simultaneously arranging for transportation to a proper level of care. Patients that present to a level IV trauma center should be adequately screened to ensure that the hospital is able to provide the right level of care.

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2012
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Performance Measure 3: Reduce deaths outside of trauma center

The Arizona State Trauma Advisory Board adopted the trauma triage guidelines developed by the Centers for Disease Control and Prevention. This evidence based tool recognizes seriously injured individuals who should receive treatment at a designated trauma center.

Table 4: Mortality at non-trauma centers

3rd Performance Measure: Mortality at non-trauma centers	Died		Survived	
	N	%	N	%
Level I	603	2.5%	22,946	97.4%
Level IV	32	1.1%	2,799	98.8%
Non-trauma centers	196	1.3%	14,501	98.6%

Table 5: Mortality at non-trauma centers by county of residence

	N	%
Region		
*Missing county	1	0.5%
Out of state county	15	7.6%
Northern	15	7.6%
Southeastern	44	22.4%
Central	103	52.5%
Western	18	9.1%

Table 5: Age demographics of deaths outside trauma centers

	N	PctN
Total Died	196	100%
Age		
<5	1	0.5%
5-8	1	0.5%
15-17	2	1.0%
18-24	3	1.5%
25-44	13	6.6%
45-64	29	14.7%
65+	147	75%

Table 6: Injury demographics of deaths outside trauma centers

	N	PctN
Type of injury		
TBI	55	28.0%
OTH HEAD,FACE,NECK	11	5.6%
SCI	1	0.5%
VCI	11	5.6%
TORSO	27	13.7%
UPPER EXTREMITY	7	3.5%
LOWER EXTREMITY	73	37.2%
OTHER & UNSPECIFIED	3	1.5%
SYSTEM WIDE & LATE EFFECTS	8	4.0%

Table 7: Admission demographics of deaths outside trauma centers

	N	PctN
Source of admission		
Non-Health Care Facility Point of Origin	180	91.8%
Clinic or Physician's Office	2	1.0%
Transfer from a Hospital (different facility)	9	4.5%
Transfer from a Skilled Nursing Facility	4	2.0%
Information not available	1	0.5%

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2012
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Performance Measure 4: Increase billing efficiency

Table 7: Billing efficiency for level I trauma centers

4th Performance Measure: Billing efficiency	ASTR - Trauma Team Activation and Arrived by Ambulance	HDD # 068X Selected	Trauma Billing Efficiency Score
Aggregate Level I	17,946	15,613	86.9%

Trauma team activations are vital resource that ensure a coordinated and capable response to injured patients presenting to a trauma center. This resource is an essential component of a trauma center and are costly to a hospital.

Financial viability ensures the sustainability of dedicated trauma care in rural communities. A commitment to clinical excellence must coincide with efficient billing.

Data from two registries (HDD and ASTR) were used to develop the following tool to describe how the designated trauma centers are performing related to trauma billing efficiency.

Trauma Billing Efficiency Score= HDD # 068X Selected / ASTR - Trauma Team Activation:

A higher value denotes a better trauma billing efficiency for the state..